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PSYCHOLOGY AND SCIENTIFIC METHODS

IS SUBJECTIVE IDEALISM A NECESSARY POINT OF VIEW FOR PSYCHOLOGY?[1]

'THE world is my idea.' These words, which form the opening sentence to Schopenhauer's 'World as Will and Idea,' may be taken to express with literal exactness the speculative attitude of the psychology of to-day towards reality. This attitude of subjective idealism has been inherited through a long and highly reputable line of philosophic descent. It meets us at the beginning of modern philosophy in Descartes's famous *cogito ergo sum;* it finds a more complete expression in Berkeley's dictum that all *esse* is *percipi,* but attains its most suitable formulation for the purposes of psychology in the sceptical analysis of David Hume, who, discarding as fictions the *res extensae* and *res cogitantes* of his predecessors, declared the mind, and the known universe as a whole, to be merely a 'bundle of perceptions'.

It is safe to say that the psychology of to-day has not gone much beyond this standpoint of the great English empiricist. Rejecting the soul as a metaphysical superstition, and affirming the knowledge of an extra-mental world to be mediate, and hence uncertain, it rests content to remain within the circle of its own ideas, except perchance when it now and then strays into the realm of physiology, or is lured away into the attractive but uncertain domain of the unconscious. In general, however, it asserts that the limits of the ego can not be transcended; that reality is what the subject makes it, and that without this making the external is, for all we know, non-existent.

It is an extremely fascinating doctrine, this radical subjectivism, which becomes solipsism when interpreted in terms of the intellect, and pragmatism when formulated in the categories of the will. The doctrine seems so self-evident, it is so clear and convincing, that it is apt to be accepted without question. Therefore, even to hint at the possibility of its untruth may appear rash. The present discussion, however, ventures to raise the question as to whether its

[1] This paper was read before the North Central Section of the American Psychological Association, at Chicago, November 26, 1904.

validity may not legitimately be doubted, and whether modern empirical psychology is obliged to assume this point of view at the only possible theoretical interpretation of reality.

We can best answer this query by reviewing the chief arguments that have induced psychology to accept as certain the theory that known reality is purely subjective. These arguments fall under the general head of the relativity of sensation, and rest on the assumption that the only certain knowledge is that which is direct and immediate. The ancients were impressed with this thought, and from the days of Protagoras and Aristippus down to those of Ænesidemus and Sextus Empiricus felt the force of the doctrine of *homo mensura*. The senses constantly deceive us, and do not certainly point to a stable externality; hence only of the subjective states can reality be unreservedly affirmed. To this argument modern psychology has added another, which rests on the hypothesis that all our conscious states are physiologically conditioned. There is no psychosis without a neurosis. The external stimulus (standing for the extra-mental object) becomes a conscious fact only by exciting the end organs of sensation, traversing the afferent nerves, and producing a change in the cerebral cortex. To suppose that a process so mediated can reveal to us an independent reality, we are told, is sheer nonsense. We must reject the world of the naïve realist, and admit that all we can know are elements of our own consciousness.

The physiological argument is excellently and briefly stated by Professor Strong as follows: "The physiological argument takes its departure from the fact that every perception is correlated with a perceptional brain event, which latter is a fairly remote effect of the action of the perceived object on the senses; and argues from this that it is impossible the knowledge of the extra-bodily object should be immediate. It points, moreover, to the account of the constitution of the object given by physical science, according to which color and other secondary qualities are in the object something entirely different from what they are in the mind."

This is the argument, and in effect the only one by which subjective idealism attempts to set forth and coordinate its facts. I say that it is the only argument, because other reasons given to substantiate the view-point of solipsism are in the nature merely of supposedly self-evident postulates, not in any sense demonstration or proof. On the other hand, the arguments from the relativity and mediate nature of sensation are not adequate to reach the conclusions which they aim to establish, for they are incapable of proving positively their thesis. All they accomplish is to discredit the view of naïve, uncritical realism, but to show that this view is un-

satisfactory is by no means to prove that subjective idealism is true. As a positive proof, the entire argument is a failure, for the simple reason that it can establish the relativity of our perceptions only by holding that among these there are certain factors that are not relative. At every step it assumes in some instances to be true that which in general it is trying to prove false. The fallacy here contained I have endeavored elsewhere[2] at some length to point out, and shall not attempt within the limits of this paper to review it. I will simply repeat that the argument from the relativity of perception to subjective idealism fails as a positive proof, because it assumes that we possess an absolute knowledge, immediate and direct, of certain experiences in order to prove that other, and indeed all, experiences of exactly the same nature are relative, mediate, and subjective. So it happens that if the premise be true the conclusion must of necessity be false, while the truth of the conclusion establishes the falsity of the premises by which the very conclusion is reached.

This, then, is where the argument from relativity leaves us. We find it sufficient to discredit the assumptions of the plain man, but insufficient to construct for itself a view. Subjective idealism, if it hopes to establish its contention, must do so on grounds other than negative. This it attempts to do by the assertion that we can know only ideas. Translated into terms of solipsism this statement reads, I can know only my own conscious states. This is the very citadel of the idealistic faith, and is generally considered impregnable. In regard to it Schopenhauer has remarked that solipsism can not be proved false, but that the practical man who seriously holds to such an hypothesis is a fit subject for the mad-house. The correct position, however, I believe to be the opposite. I can see no madness in a person holding theoretically, or even practically, the position of solipsism. It means a radical but consistent interpretation of experience in terms of the new idea, and conduct for this reason should be no different from the point of view of the subjective idealist than from that of the uncritical realist. The former would recognize among his ideas certain mental states that were relatively unstable and subject to his voluntary control, while there would be others unyielding and beyond his power to change or direct. The approaching train, although merely his idea, would still be a fact capable of causing destruction to another idea, or set of ideas, his physical body. In this purely mental world would be subjective and objective elements. The solipsist would find it necessary to relate these elements in a proper coordination and subordi-

[2] *Philosophical Review*, March, 1902, in an article on 'The Common-Sense View of Reality.'

nation, and he thus would act with a due regard for himself and others. It seems to me that the objection of practicability urged against subjective idealism is based upon a misunderstanding of the scope and meaning of the doctrine. It is not for this reason that it must be set aside, but rather because when rigidly interpreted it leads to a self-contradiction far more fatal than that which confronts the realist. This statement to be justified must be examined further.

The assertion that I can know only my ideas may mean one or both of two things, namely: I can have as an object of direct, intuitive knowledge only my past conscious states; or that, in any mental state I may possess, my knowledge is limited to a content which is itself a part of that mental state. Let us look at the latter consideration first. For example, suppose I make the explicit or implicit judgment, this object is a book; the subjective idealist would assert without hesitation that the book of my experience is a purely subjective affair, an ideal element in the sum total of the conscious moment. There may be an external reality corresponding to my experience of book, but of that I can have no knowledge.

The first objection which I believe may be brought legitimately against this assertion is that the content of a total state of consciousness can not itself be ideal, paradoxical as this statement may seem. The content is not a part of the conscious state, as the branches are a part of the tree, or the sun a part of the universe. The content is of a different order and nature. If the content were in the ordinary sense ideal, mark what would follow. This content, as ideal, must likewise have an object, for we know of no consciousness devoid of content, nor can we imagine any. But carrying out our assertion, that we can know only ideas, we would be forced to admit that this content of the content would itself have a content, also ideal, and so on to infinity.

Let us look at the matter from a slightly different point of view. Every complex state of consciousness ordinarily is held to be made up of more simple psychic elements, namely, sensations and images. It is these, according to the doctrine of idealism, that the complex state of consciousness knows, and not an extra-mental reality corresponding to them. These are the objects of our immediate knowledge, which are present as elements in the complex noetic state. Should we say, to avoid the difficulty of the infinite regress pointed out above, that these elements do not know but are known, we plunge ourselves into another equally great difficulty; for how can we then explain the process by which a combination of non-noetic states form a complex conscious state capable of knowledge? So we are confronted with a dilemma in both cases. If we assert that the com-

plex conscious state has simply conscious states as objects of knowledge, it would seem to follow that as conscious they must be conscious of something, and so on *ad infinitum*. If, however, we consider them non-noetic elements of consciousness, we are forced to raise the question as to how their combination can yield a complex noetic state.

But I am quite sure that this entire argument will appear to many as a quibble that can easily be set aside by the assertion that the noetic state has been illegitimately divided into subject and object, knower and known. Knowledge-of-book is one total complex in which the knowledge and the book are separated only by a false abstraction. And this I am quite willing to grant. The immediate state of consciousness is a complete unit and there can be no artificial separation between knowledge-of-book and book: there is no knowledge without book and equally there is no book without knowledge. Book in this sense is not something that I know, so much as a state of consciousness through which I know. If this is a true analysis, however, we can not say that we know ideas, but that we know by means of ideas, or that all knowledge is ideal, an assertion of a truism which no one can dispute. But in *this* state of knowledge there is an intention which ascribes an extra-mental reality to every noetic psychosis. It is that intention which sets up an object non-ideal, or at least extra-ideal. If the intention can not realize itself knowledge is false, for it does not reach its object. To assume that we really know we must believe the intention is capable of realizing itself. It is this intention that gives an object to our knowledge, and this very intention asserts the extra-ideal character of that which it intends. If there is nothing to which the intention can refer, then all knowledge is an illusion. We can not know that we have a mental state even; which seemingly subjective knowledge is, as will be shown later, in the moment of knowing a fact of extra-mental reference.

But the problem may be approached from still another standpoint. To do this we may again go back to our consciousness of book, concerning which, as has already been said, we are told by the idealist that the book, and hence all its qualities, are mere determinations of my present conscious state. I reply that if this is so, I can never know book; nay more, I can never know even its most subjective quality, color; for the color is not merely the determination of my present conscious state. It exists as color only because my present state of consciousness is linked with past experiences. Take away all reference to that which transcends the present moment (and all else in extra-mental), and the content of my experience vanishes. Doubtless something would remain, but what that some-

thing would be we can only surmise; it certainly would not be color; it clearly would not be a judgment in regard to an experience; no, not even a sensation, for a sensation is intellectual and demands more than the immediate experience for its reality. Even the animal so low down the scale of mental life that it possesses no more complex a conscious state than 'thing-a-me-bob-again,' to use an expression borrowed from James, has in that experience transcended the immediacy of the conscious now. And here we come again to the essence of the whole difficulty. Any intellectual state, whatever it may be, depends for its validity on a something which transcends itself. The very act of knowing affirms the extra-mental, and immediate knowledge does not exist, at least as far as human beings are concerned. If we possessed this immediate knowledge we should not know it. All our conscious processes must be mediate. To criticise knowledge because it is mediate is to deny the possibility of any certainty whatsoever. An immediate cognition is a contradiction. It can not even arrive at *cogito*. This was the great discovery of Descartes, hinted at before in Anselm's much-abused ontological argument, namely, that knowledge, to be certain, must transcend itself, and that intellectual certainty posits something beyond the state which expresses the certainty.

But some one may urge that this extra-mental reference that knowledge demands is a reference from one conscious experience to another, and therefore a reference which does not transcend the consciousness of the individual. This brings us back from the second meaning of the proposition to the first, namely, that we can know only our past mental states; an assertion which by implication is contained in that part of the proposition already discussed; for, as we have already seen, knowledge of the present state demands as its warrant a knowledge of past experiences. Thus these two meanings in the assertion of subjective idealism fall under one head in the last analysis. The first proposition, in the light of what has already been said, can be examined briefly.

It must be remembered that the past conscious experience as such no longer exists. Our knowledge of it is a mediate one, as indirect and remote in many ways as the knowledge of a physical fact, and it is as truly extra-mental as is the spatial universe. Any argument which may be applied to prove the unreality of the external world may be used to prove the unreality of past experience. It is the source of deception and illusion quite as much as is the world outside. The latter is external to us in space, the former, however, in time. If we doubt the existence of the one we can legitimately doubt the existence of the other as well, and the only reality of which we then can be certain in the sense that subjective idealism

demands is a reality of the immediate moment. Regarding this, however, as has already been pointed out, no assertion can be made which does not transcend its immediacy; in other words, all knowledge, even of the most rudimentary type, must on this assertion cease. If subjective idealism were true, no one could make the assertion. Indeed, the mind would be that bundle of conscious elements that Hume conceived, but the bundle would have no bond of connection between its various parts, mental life would have neither continuity nor meaning; it would in fact be nothing at all that we can conceive, a point of consciousness without relation to past or future. To this psychic atomism does solipsism, when rigidly interpreted, inevitably lead. Such a doctrine can not be successfully refuted, for it offers no point of attack. Its mere statement is an absurdity.

If the above analysis be correct, we are forced to the conclusion that, while naïve realism contains contradictions, it can not so easily be set aside as ordinarily supposed. The plain man is often accused of views that he does not possess, and though his suppositions in regard to reality may be stated to his disadvantage, it does not follow that by plunging him into difficulties his critics have removed all difficulties from their path. Subjective idealism can not establish its position by negative criticism. Its positive assertions have been shown to be full of contradictions, and are untenable. But if both naïve realism and subjective idealism prove incapable of giving us a true knowledge, two roads to reality are left open: one by means of a critical realism, and the other by means of an absolute idealism. The merits of these two views it is not my purpose here to discuss. I will simply add in conclusion that many of the difficulties which subjective idealism encounters confront absolute idealism as well.

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LOGICAL PROBLEMS, OLD AND NEW

THE up-to-date fashion of studying the nature of judgment is the most liberal one conceivable, basing apparently on Mill's conception of logic as the entire theory of the ascertainment of reasoned or inferred truth. By an easy extension in the scope of 'ascertainment' everything which in any way contributes to make a given meaning what it is comes in for a due share of consideration. The structure and functions of the human organism, appetites, feelings, the historical setting of the particular judgment-act, and the assertion embodied in this act are all reckoned with. Some

investigators among the Germans go so far as to regard the need and methods of communicating assertions as a proper theme of logical study,—an extreme view whose chief use is to show how far afield men nowadays hunt in quest of facts relative to logical issues.

The new tendency justly claims to be the outgrowth of scientific methods and results. The judgment, for instance, is investigated not merely in the light of what is asserted in it, but quite as much with reference to all those circumstances which an observer may find connected with its rise and function. No longer is the appeal to the introspection of the judging individual enough; this latter party must be watched in the act of thinking, his conduct must be described and later compared with his own assertions. Such a study of function involves an inquiry into the aim and motive of judging. Here again the patient's own remarks and intentions do not wholly determine the diagnosis of the doctors of philosophy; unbiased observations made by trained observers are likewise taken into account. Most important, however, is the fact that the center of interest remains in every case the solution of this question, how does the individual *M* come to judge that *A* is *B*? What makes him think *as* he does, *when* he does, and *for the purpose* he does?

Putting the question thus shows up the radical difference between logics old and logics new. These latter do not study the methods of argument, the forms of syllogism, and the implications of accepted meanings. Following the verdict of Mill once more, the latter-day logician finds in Aristotelianism a formal logic whose end and aim gained by the observance of logical precepts, is not the truth, but merely consistency. For this modern thinker such a study is unprofitable in every sense. Now inasmuch as many men have convinced themselves that whatever is unprofitable is thereby false, and have argued that necessary connection, consistency, identity, and all the other conceptions so vital to scholastic thinking are nothing save ideal constructions or ways men have chosen to think in order to gain their ends, a comparison of old logic with new may help us to see the import of this conviction. The startling assertions made of late may best be understood and estimated after we have found what problems have been studied.

The new logic has often been heralded as the successor of the elder one, as if it really displaced this latter by refuting all the supposed 'logical forms' discovered both by Aristotle and by the modern mathematicians. But I have been impressed by the fact that the different problems handled by the old school and the new one prevent sweeping condemnations. There are other reasons for checking the ardent nihilism of certain freshly issued theories, but

I shall discuss here only the objection which bases upon the heterogeneity of the subject-matters of the respective logics.

The most cursory examination of what is vaguely called a judgment shows a twofold problem; the judgment-act must be studied as an event taking place under definite psychophysical conditions, while, on the other hand, the meaning asserted in this act must be investigated with reference to its connection with other meanings. We need not struggle with metaphysical difficulties in order to see that the event of judging is determined by many and various things, such as the individual peculiarities of the agent, the field of his momentary attention, his feelings, desires and so on. All his previous experiences color in some way the present act and its asserted 'content.' Hence the assertion, the willed meaning thought and perhaps uttered, is not detachable from its birthplace and its forebears. *What* is judged 'to be the case' is qualified by all the determinants of the whole present situation. And so one is tempted to infer that the *grounds* for so judging are just these determinants.

But an inspection of a concrete case reveals a subtle confusion. Let us suppose that some need arose for me to find out what the sun is composed of. Consciousness of this need somehow holds my attention to various 'relevant' facts. The temperature of the orb, its weight, the disturbances on its surface, and so on are all thought of, and lead me to think that a body presenting such peculiarities 'must be' gaseous. What leads me to judge that the sun is gaseous? Of course, the need for *some* explanation leads me to judge something; but this need is not the reason why the sun is gaseous. It seems like a travesty upon earnest thinking to perpetrate such platitudes, yet the tendency of the times warrants the commonest of commonplaces. I admit freely that the recently advanced refutations of dualism are sound, but I fail to see how they are pertinent to the logical problem. Let us grant with the humanists that a one-to-one correspondence of 'real objective' with 'real subjective' is absurd, and that the psychical is impossibly a 'reproduction' of an objective archetype. Have we not still the problem of *reference* awaiting solution? In every judgment there is a reference to a 'state of affairs' which is, in its very significance, not qualified by the special conditions which bring about and determine that particular judgment-act and the 'interpretation' embodied therein. What every man, cave-dweller or humanist, *means*, when he says something, is that 'this or that is the case'; and even if some more enlightened friend could convince him that his judgment was really only an ideal construction fashioned by himself alone in order to fulfill some desire, his reply would be, 'Well, I *mean* that what I said is true regardless of all you say.'

Accepting the modern theory that the 'states of affairs' referred to in every judgment are only meaning-complexes, ideal constructions, the same difficulty confronts us as of old. For the meanings in such complexes are what they are only when their reference-objects are accepted with them. Is it not clear that the 'sun' of which I speak and about which I judge is 'a bright spot overhead,' 'a body at a great distance from me,' or 'the center of our planetary system'? And does not this preclude my thinking of 'sun' as a mere idea, a hypothesis, a habit of interpreting experience? Were I to find nothing but such characteristics in that which I mean by 'sun,' I could not say a single thing about it which I now do. That which is a bright spot overhead or the center of our planetary system can not be a psychical state. In short, the very meaning of the idea is 'that which is not an idea.' The curious thing is that nearly all modern logicians fail to see just this point; that all there is to a thought, idea or belief, *as such,* is what a clumsy psychology naïvely calls the 'content,' and that this 'content,' instead of being 'in' the psychical state, as the barbarous terminology might seem to indicate, is *just what we think it to be.* Indeed, this is what we call the 'content.'

The reason for the rejection of the old logic by the new lies in this latter's hopeless confusion of the judgment-*act* with the willed *meaning.* There are three utterly distinct sets of relations to be studied: (1) The relations of one meaning to another; (2) the relations of a meaning to its own origin; and (3) the relations of a meaning to the origin of another meaning. The second and third sets are investigated by the new logic. They form a perfectly legitimate object of inquiry, probably capable, under sane treatment, of yielding us a vast fund of new and useful facts. But, in order to investigate them properly the scientist is often forced to abstract from the intended meanings; that is, he thinks of these latter as 'phenomena' in the mental life and handles them solely as occurrences. What wonder, then, that, finding the needs and desires of men direct their thinking, he concludes that *what* is judged to be the case is 'caused' by human will! The old logic, on the other hand, confines itself to the study of certain typical relations existing between the various 'things-we-mean.' It can not hope to explain how we come to think about just the things we do at just the time we do. Nor can it aspire to explain 'will,' 'psychism' and the like, save in so far as the way in which meanings relate gives some general indication of the nature of the thinking process. In one sense, 'mere consistency' is here studied, but not as if it were, as Mill and others think, something different and apart from the 'truth.'

In this connection another disaster has been brought about by modern psychology; old-time logic is popularly labeled 'the science of the equation of concepts' or 'the science of equivalent expressions,' but usually in such a way as to make one think that *what* the logician compares are the psychical states, as some 'condition of mind,' instead of the intended meanings, which are not ideas nor feelings nor volition. A discussion of this error can not find place here. Enough to say, though, that the relations of my 'mental states' to one another are *toto cælo* different from the relations of the things I 'think about' (while in those states) to one another.

There are, then, at least three distinct problems. Thus far no evidence is forthcoming whereby any one of them may be reduced to the terms and conditions of either or both of the others. Unless, carried away by the wish to find a smooth philosophy, we must content ourselves with special studies. And this forbids sweeping condemnation of other lines of investigation. It is unsafe to say much more than this as yet. Old-fashioned logic is being taken up by mathematicians, and expanded far beyond its scholastic form; as a science of correction it is still active. Merely because it can not do duty as a metaphysic, a theory of ethics and a biology, is hardly an honest reason for hooting it out of court. Substantially the same charge may be brought against its scoffer; genetic logic hardly helps us to think better, any more than it can explain the 'origins' of logical consistency or can derive what I will to mean from the conditions which lead me to desire 'things.'

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DISCUSSION

IS RADICAL EMPIRICISM SOLIPSISTIC?

IF all the criticisms which the humanistic *Weltauschauung* is receiving were as *sachgemäss* as Mr. Bode's in this JOURNAL for March 2, the truth of the matter would more rapidly clear up. Not only is it excellently well written, but it brings its own point of view out clearly, and admits of a perfectly straight reply.

The argument (unless I fail to catch it) can be expressed as follows:

If a series of experiences be supposed, no one of which is endowed immediately with the self-transcendent function of reference to a reality beyond itself, no motive will occur within the series for supposing anything beyond it to exist. It will remain subjective, and contentedly subjective, both as a whole and in its several parts.

Radical empiricism, trying, as it does, to account for objective knowledge by means of such a series, egregiously fails. It can not explain how the notion of a physical order, as distinguished from a subjectively biographical order, of experiences, ever arose.

It pretends to explain the notion of a physical order, but does so by playing fast and loose with the concept of objective reference. On the one hand, it denies that such reference implies self-transcendency on the part of any one experience; on the other hand, it claims that experiences *point*. But, critically considered, there can be no pointing unless self-transcendency be also allowed. The conjunctive function of pointing, as I have assumed it, is, according to my critic, vitiated by the fallacy of attaching a bilateral relation to a term *a quo*, as if it could stick out substantively and maintain itself in existence in advance of the term *ad quem* which is equally required for it to be a concretely experienced fact. If the relation be made concrete, the term *ad quem* is involved, which would mean (if I succeed in apprehending Mr. Bode rightly) that this latter term, although not empirically there, is yet *noetically* there, in advance—in other words it would mean that any experience that 'points' must already have transcended itself, in the ordinary 'epistemological' sense of the word transcend.

Something like this, if I understand Mr. Bode's text, is the upshot of his state of mind. It is a reasonable sounding state of mind, but it is exactly the state of mind which radical empiricism, by its doctrine of the reality of conjunctive relations, seeks to dispel. I very much fear—so difficult does mutual understanding seem in these exalted regions—that my able critic has failed to understand that doctrine as it is meant to be understood. I suspect that he performs on all these conjunctive relations (of which the aforesaid 'pointing' is only one) the usual rationalistic act of substitution—he takes them not as they are given in their first intention, as parts constitutive of experience's living flow, but only as they appear in retrospect, each fixed as a determinate object of conception, static, therefore, and contained within itself.

Against this rationalistic tendency to treat experience as chopped up into discontinuous static objects, radical empiricism protests. It insists on taking conjunctions at their 'face-value,' just as they come. Consider, for example, such conjunctions as 'and,' 'with,' 'near,' '*plus*,' 'towards.' While we live in such conjunctions our state is one of *transition* in the most literal sense. We are expectant of a 'more' to come, and before the more *has* come, the transition, nevertheless, is directed *towards* it. I fail otherwise to see how, if one kind of more comes, there should be satisfaction and feeling of ful-

fillment; but disappointment if the more comes in another shape. One more will continue, another more will arrest or deflect the direction, in which our experience is moving even now. We can not, it is true, *name* our different living 'ands' or 'withs' except by naming the different terms towards which they are moving us, but we *live* their specifications and differences before those terms explicitly arrive. Thus, though the various 'ands' are all bilateral relations, each requiring a term *ad quem* to define it when viewed in retrospect and articulately conceived, yet in its living moment any one of them may be treated as if it 'stuck out' from its term *a quo* and pointed in a special direction, much as a compass-needle (to use Mr. Bode's excellent simile) points at the pole, even though it stirs not from its box.

In Professor Höffding's massive little article in a recent number of this JOURNAL,[1] he quotes a saying of Kierkegaard's to the effect that we live forwards, but we understand backwards. Understanding backwards is, it must be confessed, a very frequent weakness of philosophers, both of the rationalistic and of the ordinary empiricist type. Radical empiricism alone insists on understanding forwards also, and refuses to substitute static concepts of the understanding for transitions in our moving life. A logic similar to that which my critic seems to employ here should, it seems to me, forbid him to say that our present is, while present, directed towards our future, or that any physical movement can have direction until its goal is actually reached.

At this point does it not seem as if the quarrel about self-transcendency in knowledge might drop? Is it not a purely verbal dispute? Call it self-transcendency or call it pointing, whichever you like—it makes no difference so long as real transitions towards real goals are admitted as things given *in* experience, and among experience's most indefeasible parts. Radical empiricism, unable to close its eyes to the transitions caught *in actu*, accounts for the self-transcendency or the pointing (whichever you may call it) as a process that occurs within experience, as an empirically mediated thing of which a perfectly definite description can be given. 'Epistemology,' on the other hand, denies this; and pretends that the self-transcendency is unmediated or, if mediated, then mediated in a super-empirical world. To justify this pretension, epistemology has first to transform all our conjunctions into static objects, and this, I submit, is an absolutely arbitrary act. But in spite of Mr. Bode's maltreatment of conjunctions, as I understand them—and as I understand him—I believe that at bottom we are fighting for nothing dif-

[1] Vol. II., No. 4, pp. 85–92.

ferent, but are both defending the same continuities of experience in different forms of words.

There are other criticisms in the article in question, but, as this seems the most vital one, I will for the present, at any rate, leave them untouched.

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REVIEWS AND ABSTRACTS OF LITERATURE

University of California Publications. Philosophy. Volume I. Studies in Philosophy prepared in Commemoration of the Seventieth Birthday of Professor George Holmes Howison. Berkeley. The University Press. November 29, 1904.

This volume is beautifully executed, and its essays are all of solid merit. Dealing as they do with diverse topics, it will be best to take up each in turn very briefly.

The first paper is entitled *The Summum Bonum,* by Professor McGilvary. "Before discussing the question of the nature of the highest good we must first ascertain what is meant by 'good' in the positive degree." But 'good' is an ambiguous term. Sometimes it means the 'pleasant'; sometimes, the 'desired.' Sometimes, the desirable in the sense of 'that which we should desire if all the consequences of all the different lines of conduct open to us were actually exercising on us an impulsive force proportioned to the desires or aversions which they would excite if actually experienced' (what the author calls the 'teleologically desirable'). Sometimes it means the desirable, not in the sense that we now do, or ever will desire it, but in the sense that we 'feel that we *should* desire it' (the 'categorically desirable'). Besides all these meanings, the good may mean, 'not the obligation to *desire* the object, but the obligation to *attain* the object without reference to desire' (the 'categorically obligatory').

"Having thus discovered so many meanings for the term 'good,' we should be prepared to find as many meanings for the term 'highest good' or *summum bonum.* And this is exactly what we do find." Along with this conception of the highest good there goes a sense of obligation to strive to attain it, the 'good' and the 'obligatory' being identical only in the last of the uses of the term above enumerated.

'We are now prepared to take up the question whether there is any *reasonable highest good* for men at large.' From the individualistic point of view none can be asserted. But from the point of view of the social nature of the individual 'all normal men do have at heart the good of some other beings than themselves,' and this common good becomes identified with the individual good. In this sense only is there a highest good.

The second paper, by Professor Mezes is a discussion of *The Essentials of Human Faculty.* It is a statement of the principal reasons for the human ascendency, the chief of which on the mental side is the 'ability to decide among alternatives.'

He distinguishes three general types of novel action. 'The first is action by trial and error, . . . the second, action that is purposive but not chosen, the third, action that is purposive and chosen.' Animals share with man in the capacity for the first two kinds of action. Man alone is capable of the remaining type.

'Animals ask single or simple questions, but do not ask double, complex, or general questions.' 'They *see* fitting means, but do not *seek* them; and seeking means implies the general question.' 'In brief, animals are capable of asking questions which do not involve the presence of several alternatives in their minds at once, but appear to be quite incapable of asking questions which do involve such mental alternatives.' 'The perception of relations is the distinctive human power.'

He connects the evolution of this power in a very interesting way with the evolution of the hand and of the erect stature. 'Volitional effort,' he says, 'which makes possible choice, our original differentia, turns out to be the psychic correspondent, gradually preserved and organized, of the physical strains and stresses incident to erectness.' Erectness is 'the matrix from which issued the germ of volitional effort.'

One questionable position is that in which the author says that effort is 'an additional weight the self can drop into the ideal scale prior to decision, an increment of force that may well, in the case of difficult actions, be used so to reinforce muscular energy as to render possible what muscular energy unaided could never have accomplished.' This appears to the reviewer to labor under the same limitations as Professor James's theory of the will upon which it is based—to be, in fact, a bit of antiquated faculty psychology in the midst of an otherwise illuminating organic and functional statement.

The third paper, on *Some Scientific Apologies for Evil,* by Professor Stratton, rejects the current 'attempts to justify moral evil by an appeal to natural science.' The 'law of contrast,' according to which evil is necessary as a foil or background for the good, is rejected on the ground that 'the law of contrast does not demand that actual evil should coexist with the good.' 'The mere idea of evil is a sufficient contrast,' and 'the idea or thought of evil is not itself an evil.' 'It seems as if the thought of moral evil could have been suggested perhaps even by the behavior of animals.' In any case, 'it does not appear that the evil which we actually find is indispensable to our consciousness of the good.'

Nor is evil simply good in the making, or 'lower stages of development when viewed from above.' A vigorous tree, a beautiful bird, an intelligent horse does not seem evil simply because it is lower in the evolutionary scale. A child does not seem evil because it is immature. There is no identity between the undeveloped and the bad. Professor Stratton even goes so far as to suggest that moral evolution is possible without evil, and says that we must return to the conviction 'that the truest revelation of God's character comes, not through nature or natural evolution, but by some inner light, some inner voice.' The argument is not convincing.

Professor Rieber in the fourth paper, on *Pragmatism and the A priori,*

has stated clearly one or two important principles of pragmatism and misstated others; or, at least, the reviewer thinks that the pragmatists themselves will regard them as misstatements. There is great need just at this time of a clear definition of the issues here involved.

The author's main contention is for an *a priori,* eternal or absolute element in experience, and especially in knowledge. 'Not what an idea has come from, nor what it is just now discovered to be, nor what it is going to *do* by and by, but what it eternally *is,* must furnish us with our deepest insight into the world of reality.' Therefore he objects to the appeal to evolution upon which he conceives the pragmatist to rest his case. 'Mind, which the pragmatist puts last in the evolutional series, is in the profoundest sense of the word first.' Hence the necessity of 'rising above the temporal order to a timeless point of view.' Likewise he objects to pragmatism as a pure empiricism, because he conceives that 'the pragmatist announces at the outset that thought, being a function in the present situation, exhausts its entire meaning in that situation,' whereas in truth, he says, 'we do have knowledge that is logically prior to experience,' which 'is itself the condition of experience, and therefore can not be derived from experience.' 'What meaning,' he asks, 'can we possibly attach to the pragmatist's conception of reality, that, as a whole, changes always? If he does not wish us to take him literally and after all intends to provide for some sort of permanence, how can he give his world of fluent inherited ideas any stability of meaning?'

In reply to this it might be asked what is meant by permanence and by change. If idealism insists on a permanent element in a static sense, then pragmatism is not idealistic, since it maintains that permanence means permanence in the midst of change, a moving equilibrium in which the stability of a gyroscope or the life of an organism may serve as the type. But is idealism necessarily synonymous with absolutism?

A similar line of argument would show that pragmatism is not necessarily identified with a pure empiricism, as the author thinks it is. He says: 'The path along which empirical thought moves can not be marked out except by reference to some fixed point of view that lies outside of that path.' This the pragmatist denies. A 'fixed' point of view, he says, is no point of view at all. A point of view is a developing thing. It is fixed, that is, it is taken as relatively fixed, only for the given situation, but is itself constantly undergoing evolution with the development of experience. This is empiricism, but it is not mere empiricism; it is not sheer relativism. As the author himself puts it in his exposition of the pragmatist's position, 'Even if all is flux and our conceptions of the true, the beautiful and the right are always changing, we need not despair. We must not think that we are thereafter consigned hopelessly to the quagmire of uncertainty and error. The discovery that nothing is stable need not paralyze action.'

The author further objects that 'pragmatism emphasizes effects of action as tests of validity, but does not furnish a criterion by means of which we may distinguish good from bad effects.' The reply might be made that the pragmatist finds the criterion in the social implications of

the consciousness of the individual. The pragmatist says, 'Our thoughts are born of our needs.' But in saying that he does not deny that these needs themselves need to be explained. To explain them is the socio-genetic problem. The pragmatist simply insists on basing his philosophy of life in the most obvious truths of experience and then working out from this as a basis to the consideration of the terminal problems.

The author objects to the 'genetic theory of the judgment,' upon which he says the pragmatist bases his entire logic. 'Aside from being a useful instrument in the struggle for existence,' he says, thought 'has the more important office simply to be true.' 'It is one function of a judgment to be useful, that is, to reach out beyond itself. But its other and most fundamental function is just to be true.' But surely truth is true only under specific conditions. There is no such thing as truth at large or truth in the abstract. And the specification of the conditions always introduces the possibility, nay, the necessity, of elements of utility.

He links what he calls the 'action-theory of thought' of the pragmatist with the James-Lange theory of the emotions. 'We do not act because we think, but we think because we act.' He is unable to see that both are true. He points his criticism with an illustration. 'The light in an electric globe may be said to stand midway between the current that goes in and the current that goes out of the globe. It represents a stage in the process. Now suppose the outgoing current of electricity did some work,—turned a motor, for example. The light then would be in inseparable connection with this activity. We could appropriately speak of it as a function of the action in the motor. The light, however, does not turn the motor, it is a mere attendant phenomenon in the process. Now in the action-theory of thought, the idea occupies an analogous position.' The terms of this illustration show how completely the author has missed the gist of pragmatism. From the standpoint of a strict continuity, light has existence solely in terms of vibrations (or whatever change the physicist regards as the objective counterpart of the experience of light), and in this sense 'light' does play its part in relation to the turning of the motor, at least negatively, in diverting energy that would otherwise be available for turning the motor. It is not a mere 'attendant phenomenon' in the process. The pragmatist is not committed to epiphenomenalism. One of the main contributions of a true pragmatism is to get back of the dualism implied in that theory.

Instead of its being true that pragmatism must 'stand or fall with the Spencerian agnosticism,' it is the case rather that in pragmatism we for the first time see evolution in its true setting. He is the first to take the evolution principle really seriously. Spencer's philosophy, in spite of its pretensions, never really penetrated to the real significance of evolution, as is sufficiently shown, not only by his doctrine of the unknowable, but also, as Professor Royce has recently shown, in his formal statement of the evolution principle itself. Pragmatism is no more bound up with Spencerism than it is with Hegelism.

Finally, the author falls into the error, common to nearly all of the recent critics of pragmatism, of supposing that this doctrine is com-

mitted to subjective idealism and individualism, and therefore that it is 'a protest against every species of ontology.' But identification of the logical with the ontological categories, the notion of a reciprocal determination of thought and reality, does not necessarily imply a denial of the ontological categories; it simply means protest against a certain kind of ontology.

Professor Bakewell, in the fifth paper, defends idealism against pragmatism, which he calls the *Latter-Day Flowing-philosophy*. This philosophy, he says, justly emphasizes 'the universality of the dynamic standpoint, the concrete character of experience, and its inevitable anthropocentric reading. But idealism is not thereby routed; in intellect still is found the organizing principle that makes experience intelligible; but it is intellect conceived as immanent in the process of experience, and not merely transcendent. And, inasmuch as the fixed standard is found in the life of the individual knower, the result is, to use Professor Howison's phrase, personal idealism.' This passage sets forth clearly enough the author's position. A single point will be taken up for criticism.

The true is that which works. The good is that which satisfies. This is pragmatism. But is there anything, the author asks, which might not under conceivable circumstances meet the requirements of this criterion? May we not conceive a situation in which what we now call the false and the evil would give satisfaction because it serves the utilitarian ends of the moment? If so, what becomes of the distinction between the true and the false, the good and the evil?

But is not this as if a carpenter should refuse to use his gauging instrument to mark a straight line because he had heard that parallel lines meet at infinity? No doubt there are circumstances under which it would be right to do what from our present point of view we call lying, stealing, or committing murder, but this admission does not destroy the existence or the validity of the standards which govern my present conduct. The admission of the ultimately hedonistic and utilitarian character of our criteria does not necessarily result in subjectivism and scepticism. Pragmatism is not mere individualism.

Our desires and our needs are socially determined, have a social content, and a social validity. Truth and utility have a social stability. And this sort of stability is permanent and trustworthy because an organic expression of the social character of the consciousness of the individual. Here is a genuine and practicable standard because it represents a dynamic equilibrium or balance of the actual conditions within which the individual must work out his freedom. It is no spurious and abstract validity, no pseudo-stasis of a transcendental sort, won at the price of denying all the rich diversity of concrete experience. It is in terms of experience, as the author himself says, that the standard must be stated, and this means, as he does not seem fully to realize, that the standard can not be 'fixed,' and that it is as much social as it is individual, that it is only by being social that it can be truly individual.

The sixth paper, by Professor Henderson, on *Some Problems in Evolution and Education,* is a valuable one. 'Two conceptions, springing from

the study of the process of organic evolution, are especially significant from their bearing on the theory of education.' These are the significance of infancy, and the opinion that acquired characters are not inherited.

The prolongation of infancy is to secure increased plasticity in the individual organism in order to adapt it in the increasingly variable conditions which accompany the greater complexity of structure in the higher stages of evolution. 'A stage of infancy can have no function except to prepare for unpredictable changes in which the former generation is unable to survive.' Hence the education of the human infant should be 'directed largely to the task of developing an ability that can be used in all emergencies rather than to the formation of specific habits.' Society finds in the helplessness of its infants the freedom that is the parent of progress.

If this is true 'we do not care very much whether there is any inheritance of acquired characters.' 'The more variable the environments the more likely will it be that the habits adapted to one condition will be useless, or positively an encumbrance, later on. Hence we might expect that the evolution of organisms adapted to more and more complex and variable environments, would mean the evolution of the non-inheritance of acquired characters.' The purpose of reproduction is to secure diversity. 'Heredity preserves continuity where reproduction assails it.'

Prolongation of infancy and non-inheritance of acquired characters are thus the methods by which such discontinuity is brought about in evolution as is requisite to insure this diversity of structure and function involved in all progress. And social heredity, or education, is the consciously directed means of transmitting the accumulated wisdom of the race without the blindness and rigidity of physical heredity. The law of conscious selection, fitting the weak to survive, carries evolution to a level higher than the mere blind struggle for existence with the survival of the fittest, which is the law of natural selection.

The seventh paper, on *Philosophy and Science in the Study of Education,* by Principal Burks, points out the looseness in the current phrases, 'Science of Education' and 'Philosophy of Education,' as applied to even the best systematic thought in this field. In the strict sense of these terms, as he defines them, there is no 'science' and no 'philosophy' of education. But he pleads for a more thoroughly rational philosophy of life and conduct as the basis for true educational theory. As he suggestively states the matter, 'education is merely human life under the influence of conditions and stimuli artificially instead of naturally selected. By reason of this intimate correspondence between the educational process and the normal social life of man, the fundamental problems of education are identical with those of life in its larger aspect, and the philosophy of education is nothing less than the philosophy of life.'

The eighth paper, by Professor Lovejoy, on *The Dialectic of Bruno and Spinoza,* is an able exposition and estimate of the contradictory elements which go to make up Spinoza's system. He traces back the contradiction in Spinoza's conception between the unity and the multiplicity, the

transcendence and the immanence, of the divine substance, to a similar dialectic in neo-Platonism and in Bruno. He shows at once the justice and the injustice of the diverse interpretations by Sir Frederick Pollock and Mr. Joachim, on the one hand, who expound Spinoza in a highly idealistic fashion, and of E. Caird and J. Caird, on the other, who fail to recognize the common root of the antitheses inherent in Spinoza's thought, and thus make him out more illogical than he really is. The author's own view is that it is necessary for the proper understanding of this philosopher to keep in mind 'the origin of both sides of the contradiction in a single dialectical ground, and hence the impossibility, for Spinoza, of unequivocally giving up either side, without abandoning his whole method of philosophizing.'

The ninth paper, by Professor Stuart, is entitled *The Logic of Self-realization.* "The notion of the 'concrete universal' in modern philosophy . . . is, first and foremost and in its essence, an ethical conception." The author shows that in the development of the 'explicit ethics of the concrete universal—the theory of Self-realization—the idea of derivation has for the most part been construed in a metaphysical fashion, according to the letter of rationalism, and hence misconstrued—with the result that the ideal of a completely realized self has been understood on the analogy of the rationalist's substance, as a source and origin of particular moral guidance in details.' He, on the other hand, holds 'that the ideal thus understood is as useless for any such practical purpose—for any purpose of ethical theory, that is to say—as the metaphysical concept of the concrete universal is tacitly confessed to be by its expounders for the purposes of factual science.' The true significance of the self-realization principle lies in its consideration as 'essentially an ideal of ethical method, and not a contentual or descriptive ideal from which either the details or the generalities of right conduct are to be extracted.'

Dr. de Laguna in the tenth paper, on *Utility and the Accepted Type,* starts from the common distinction between ethical judgments based upon conformity to the accepted type of what is right and wrong, and judgments based upon utility or the interest or indifference which the agent displays toward the common good. 'How can judgments so pronouncedly different in nature bear the same generic name' ('ethical')? 'The time has passed for answering . . . simply by denying the ethical character of either of the main factors involved.' By a very instructive comparison with similar judgments in the esthetic sphere, the author shows that the 'two classes of moral judgment are allied in a continuous common development.' 'The type-judgment and the act which follows it can not be understood by any abstract analysis that leaves out of account their genetic connection with consideration of utility.' That is, utility and conformity are alike essential as the progressive and the conservative elements in the moral life.

The eleventh paper, by Dr. Dunlap, is entitled *A Theory of the Syllogism.* The ordinary classification of propositions is not exhaustive as regards their forms. He substitutes the classification into simple and complex, the latter being subdivided into specific hypothetical, specific

disjunctive, general hypothetical and general disjunctive. After illustrating what he means by these terms, he shows how they are combined in the syllogism, which he defines as 'an interrelation of two judgments summed up in a third judgment.' His mode of symbolizing the relations of the propositions in the syllogism is in some respects new, and will be of interest to the formal logician.

The twelfth and last paper, by Dr. Overstreet, on *The Basal Principle of Truth-evaluation,* is an attempt to give positive character to the test by inconceivability of the opposite. The first part of the paper is devoted to a restatement of the dialectic of universal scepticism. His own positive conclusion is 'that the truth of any content whatever lies in the ability of that content to maintain itself completely.' 'Truth is an absolute uniformity or self-maintenance of meaning.'

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The Principles of Mathematical Physics. HENRI POINCARÉ. *The Monist,* January, 1905, Vol. XV., No. 1, pp. 1–25.

This article is an address delivered before the St. Louis Congress, translated by Professor Halsted. To review it here, when recourse to either the original or the translation can be had so easily, would not be worth while, did it not contain matter of philosophical interest not made explicit by the author, and yet very *à propos* to the recent frequent discussions of pragmatism. The author's general position is well known to many; yet it may be well to restate this.[1] For him the axioms of geometry are neither synthetic judgments *a priori* nor experimental facts, but rather conventions, definitions. Our choice among them remains free, and is limited only by the necessity of avoiding all contradiction.

The foundation of mechanics is closely similar, yet with a difference. Although the fundamental principles of geometry are conventions set up in studying space, because of experiments in physiology and mechanics, they do not refer to the objects experimented with. The principles of mechanics *do,* however, relate to these objects, and that science must remain experimental. The author views such hypotheses in physical science as that matter is continuous or that it is atomic as indifferent. This ought to be most critically suggestive to him who claims that, corresponding to, *e. g.,* atomic (molecular) formulæ, real atoms must exist. The real aim of the scientist is not to find out whether, *e. g.,* the ether is or is not formed of atoms, but to foresee optical phenomena. The differential equations by which he does this express relations; the former are true if the latter preserve their reality. We may *image* the relation by substituting for the equation some appellation like movement or current, but 'the real objects will remain eternally hidden from us.' If, then, between the members of different sets of images the same relations respectively exist as between the objects, one is free to choose his imagery. The differential equation is then an abstraction presenting the common features of, *e. g.,* periodic phenomena, some of which may be those of motion,

[1] Cf. 'La Science et l'Hypothèse,' Paris, 1903.

but all are not necessarily so. It means simply that between all periodic phenomena there exists a close and abstract relationship which corresponds to a profound reality, and is the consequence of more general principles of energy, of least action, etc.

We find this general position of Poincaré to be very much the same as that taken by Duhem in a recent series of articles.[2] For the latter 'a physical theory is a system of mathematical propositions, deduced from a small number of principles, which aim to *represent* as simply, as completely and as exactly as possible, an *ensemble* of experimental laws.'

In both positions we discover three implications which are of philosophic interest. The first is that, as we *use* or think these mathematical propositions, it is not only unnecessary, but indeed *impossible,* to present images which shall constitute or be adequate to their meaning. In this there is indicated also the psychological nature of scientific thinking in some fields. It is essentially *symbolic* and *efficient.* Secondly, although in response to the desire to *conceive* how something is possible, some image or series of images may be formed and some appellation, *e. g.,* movement, given, not only are these images inadequate, but it is quite possible, if images be insisted on, to get different sets of them. Accordingly different systems within almost any of the different fields of knowledge may arise, each with as good and no better claims than the others. Thirdly, and in connection with these two, a mathematical proposition (differential equation) may be *effectively* or efficiently used to control and foresee phenomena without any images at all being presented, and, accordingly, without any question as to that *truth* which has been held to consist of a correspondence between them as ideas and real things. Symbolism and pragmatism, then, go here hand in hand. In seeking knowledge in physics and chemistry one may say, indeed, that we are after *not truth, but efficiency, efficient symbols* and their rules-of-the-game-like manipulation, as an instrument of control and foresight. Paradoxically, their use makes a man *able to do;* his general position, his thinking all reality in the likeness of some image, can determine only what he does.

In his present paper Poincaré 'diagnosticates' the case of physics in the crisis through which it is now passing—crisis because of 'Zeeman effects' and radium and 'Brownian movements,' etc., and in so doing he recognizes the above principles.

Mathematical physics, born of celestial mechanics, represented all nature as 'springing' from masses which attracted and repelled each other according to some exponent, not always —2, but perhaps —5 or —6 (Briot's atoms of ether). It rendered the further service of 'making precise the notion of the physical law as not something static and immutable, but as a differential equation.' The reviewer finds in this origin one reason for the persistent attempts made to image all phenomena in terms of the changes in the configuration of minute hard masses, *i. e.,* for one kind of atomism, a mode of *conceiving* which emphasizes particularly the keeping of the law of identity intact.

[2] *La théorie physique, son objet, sa structure,* P. Duhem. *Revue de Philosophie,* April, 1904–January, 1905.

But for our author this mode of conceiving is not necessary. He finds that the first crisis arrived when this conception of 'central forces' no longer appeared sufficient. 'One gave up trying to penetrate into the *detail* of the structure of the universe, and was content to take as guides certain *general principles* whose object is to spare us this minute study.' Thus, for example, in a machine in which the initial and final wheelwork is alone visible, and the nature of the internal mechanism is not known, the principle of conservation suffices to determine for us what ratio the couples applied to each wheel must have in order to effect compensation.

Our author mentions six general principles whose application as 'rules of the game' enables us to draw conclusions, whatever may be the invisible mechanism in nature. These have resulted from experiments with objects and refer to these, yet are nevertheless conventions and may not always be found efficient.

They are: (1) the conservation of energy, (2) its degradation, (3) the equality of action and reaction, (4) relativity, (5) the conservation of mass and (6) least action.

To illustrate their application, he says that although 'we know nothing as to what is the ether, how its molecules (?) are disposed, whether they attract or repel each other, we do know that its transmission of optical and electrical perturbations is made conformably with these general principles of mechanics, and that suffices for the establishment of the equations of the electromagnetic field.'

'The hypothesis of central forces contained all the principles,' but now this conception has become a useless support, or rather embarrassment, since it makes the principles partake of its hypothetical character. Enlarged, found in different vestments, consolidated as these principles have been, are they now to crumble away in the presence of radium and Brownian movements, etc.? A second crisis!

Take the principle of Carnot, the only one not an immediate consequence of the hypothesis of central forces; for if to these all physical phenomena were due, then all these should be reversible. But this was not so in nature. Events could not be turned backward without the hands of the Maxwellian demon. At least so it was thought until recently the microscopist saw in the movements of little particles in suspension motion transformed into heat and conversely, and the Carnot principle was imperiled.

Even the principle of relativity, according to which the laws of physical phenomena should be the same whether for an observer fixed or for one carried along in a uniform movement of translation, has been attacked: Take two electrically charged bodies, seemingly at rest; the earth nevertheless carries them; but a charge in motion is a current; we have, therefore, really two currents which attract each other. Measure this attraction, and have we not measured the velocity of the earth absolutely and not relatively?

Again it has been attacked in the very ingenious attempts made to measure the velocity of the earth in relation to the ether, but the results have been negative. To explain this obstinacy the mathematicians have

had to *accumulate* hypotheses, such as that bodies in motion undergo a uniform contraction in the sense of the motion and that in forces those components which are perpendicular to the translation of the earth are reduced. 'The very energy of the defense proves how serious has been the attack' on the principle of relativity.

So, also, has the Newtonian principle of the equality of action and reaction been questioned. It has been held that one electron makes another at a distance vibrate through the mediation of the 'intervening ether.' Evidently the compensation between the action and reaction could not be simultaneous; the perturbation has a finite velocity. If the action and reaction be held to take place between the ether adjacent to the electron and this latter, this is contrary to the principle of Newton, since the projectile here has no mass; it is not matter, but energy. Analogously and experimentally it is possible to get what is termed the 'Maxwell-Bartholdi' pressure of light.

One way out of the difficulty, seemingly, is to suppose the ether attached to some *material* substratum; but this has been experimentally disproved by Fizeau, and Michaelson and Morley. Another is that 'the movements of matter are exactly compensated by those of the ether; but the principle so extended would explain everything since, whatever might be the visible movements, we could always imagine hypothetical movements which compensated them.' But able to explain everything, it permits us to foresee nothing, it becomes inefficient and useless.

In this we again discover Poincaré's recognition of a view-point we have previously emphasized, viz., that a general or universal principle may influence what a man does or wishes to do, but can not make him able to do. The conviction, *e. g.*, that *everything* is energy and that this is conserved, does not always enable one the better to foresee and control phenomena. This can be done at present only by the mathematical symbolization of *experimentally* measurable quantities in the form of an equation. Put in another way, one may say that if a term be raised to a genus it can no longer be used as a species by which to differentiate, yet differentia must be discovered in order to predict and control. We will leave it to the reader to make the application to panpsychism, etc., and return to our author's presentation of the attack on Lavoisier's principle of the conservation of mass.

'The calculations of Abraham and the experiments of Kaufmann have shown that the mechanical mass is null, and that the mass of the electrons, at least of the negative ones, is of exclusively electrodynamic origin; there is, therefore, no mass other than this latter, and this augments with the velocity and even depends on the direction.' 'So-called mechanical masses will vary in accordance with the same laws as the electrodynamic masses. And if no longer a constant mass then there is no longer a center of gravity.' 'And if the coefficient of inertia is not constant can the attracting mass be?' That is the question. We here see the difficulty which has been felt from, say, the time of Maxwell in defining mass crystallized by the shock of recent experimental work.

We now come to the principle of the conservation of energy. This is

'strained' by all the recent work on radioactive bodies. They 'create' incessantly (?) a notable amount of heat. Sir Wm. Ramsay, to be sure, says this store of energy is, however, quite exhaustible, say, in 1,250 years.

But let it be conjectured, by way of explanation, that, *e. g.,* radium is only an intermediary taking up energy and giving it out in divers forms! Then our general principle is saved; but by what an advantageous, convenient, unverifiable and irrefutable explanation! All the objections of future experimenters are answered beforehand; they can not assail the principle. It is intact; but of what *use*? Made general, how inefficient!

'In the presence of this general ruin of the principles, what attitude will mathematical physics take?' First, it is proper to ask if all of this is really true, for all these objections are encountered only among infinitesimals. However, only *experiment* can settle the question, and in the meantime we are to continue our work as if the principles were still uncontested, or, in the face of our doubts, make an effort to save them. We must 'heap up hypotheses,' leaving it to the experimentalists to seek the *crucial* experiment with which to decide between them.

But suppose all such efforts fail, and we can not reconcile the principles with the results of experiment. Shall we try to mend them by a *coup de pouce,* like that one used in accounting for the energy of radium? That is always possible, but with it the principle would cease to be fecund.

Consequently 'it would be necessary to rebuild anew,' to have a third period bearing traces of the second as this did of the first. And in this perhaps it is the kinetic theory of gases which is about to serve as a model for the others. The laws of chance will then make a very great number of elementary facts cooperate for a common end. 'Physical law will then no longer be solely a differential equation, but will take the character of a *statistical* law.' We should, perhaps, likewise have a whole new mechanics where inertia increases with the velocity! Ordinary mechanics would remain a first approximation, true for velocities not too great, and we would still act as if we believed in the principles, as if they were true within these limits. They are too useful to deprive ourselves of them entirely, but they would not be efficient for data though extended universally.

In conclusion, we may repeat the statement of the principles of philosophical interest which the author seems to make use of. These are: Mechanical principles are *conventions* set up because of and referring to objects experimented with. These, as the results of certain other experiments show, are, if not false, at least useless if extended universally. A physical law or theory consists of mathematical equations containing symbols for real relations, and by the manipulation of these equations enables us to predict and to control (scientific symbolism and pragmatism) in an experiment without presenting images (atoms, etc.) for the meaning of these symbols, and as to the structure of objects; such equations apply to changes of state, of quality, etc., as well as to those of position; if images be insisted on, different systems are possible. Physical science is indifferent to truth if this be only the correspondence between images and reality, but rather is concerned with the efficient instruments of manipula-

tion and experimentation, *i. e.*, with symbols, equations and with facts. Only in this way is the use of apparatus made possible. These—symbols, conventional principles, equations, their manipulation—and experiments with these in mind are the aspects and means of knowledge in those fields in which we are most *able to do*. This is pragmatism and not absolutism.

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JOURNALS AND NEW BOOKS

JOURNAL OF COMPARATIVE NEUROLOGY AND PSYCHOLOGY. January, 1905. *On the Areas of the Axis Cylinder and Medullary Sheath as Seen in Sections of the Spinal Nerves of Vertebrates* (pp. 1–16): H. H. DONALDSON and G. W. HOKE. – The areas, in cross section, of the axis cylinder and of the medullary sheath are very nearly equal to each other; and this holds true, with deviations of less than two per cent., of all classes of vertebrates above the Cyclostomes. *On the Number and Relations of the Ganglion Cells and Medullated Nerve Fibers in the Spinal Nerves of Frogs of Different Ages* (pp. 17–56): IRVING HARDESTY. – There are about three times as many cells in the frog's spinal ganglia as fibers in the dorsal roots; there are always more fibers in the combined nerve distal to the ganglion than in the two roots together. Some of this 'distal excess' is accounted for by the bifurcation of fibers, both sensory and motor, which occurs to a limited extent just distal of the ganglion; another known factor, and probably the most important, is the incoming of sympathetic fibers which pass into the ganglion and end there; it is also possible, though not proved, that some of the cells of the ganglia, while sending no fiber inward to the cord, send one outward. The 'distal excess' increases with the age of the frog. *Editorial. Psychology and Neurology* (pp. 57–61): H. HEATH BAWDEN. – There is need for the two sciences that deal with the nervous system to cooperate in investigation and discussion, but this is made difficult by the diverse history and metaphysics of their concepts. When once the energic conception, applied to both matter and mind, has thoroughly penetrated biology and psychology, it will go far toward removing the difficulty. *The International Commission on Brain Research* (pp. 62–65): G. ELLIOT SMITH. – History of the origin of the Commission, and account of its first meeting in London in May, 1904. *Literary Notices.*

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. January, 1905, Band 37, Heft 1 u. 2. *Quantitative Untersuchungen über die Bleichung des Sehpurpus in monochromatischen Licht* (pp. 1–55): WILHELM TRENDELENBURG. – The curve of the bleaching effect of spectral colors is well-nigh identical with that of the threshold values of these colors in faint light vision and this again identical with the curve of the energy absorbed. Results are in accord with theory that visual purple reenforces faint light vision. *Experi-*

mentelle Beiträge zur Lehre vom Gedächtnis. Erster Teil (pp. 56–103): P. EPHRUSSI. – (1) In the memorizing of nonsense syllables the part method of learning is considerably more economical than the learning by wholes. (2) In the memorizing of numerals or pairs of words or numerals the whole method gives best results. *Über farbige Lichtfilter* (pp. 104–111): GUNNI BUSCK. – Determination of intensities of lights transmitted by various colored solutions for various wavelengths. Effects of intensity as well as quality of colors may be important in biology. Literaturbericht.

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. February, 1905, Band 37, Heft 3 u. 4. *Experimentelle Beiträge zur Lehre vom Gedächtnis. Zweiter Teil* (pp. 161–233): P. EPHRUSSI. – Influence of rapidity of reading on memory. Rapid reading gives best results in systematic method of learning; in chance method slow reading most economical. Paradoxical result explained as due to decrease in association in rapid reading. *Vergleichende Messung der kompensatorischen Rollungen beider Augen* (pp. 235–249): ROSWELL PARKER ANGIER. – Compensatory rolling of both eyes is identical or nearly so—both as to amount and direction. The conclusions of Delage, who found considerable differences, are criticised and denied. *Die scheinbare Vergrösserung der Sonne und des Mondes am Horizont* (pp. 250–261): EUGEN REIMANN. – History of the problem. Sky at zenith appears nearer and darker than at horizon due to degree of transparency, thickness, illumination and relative brightness of background. The apparent size of objects seen under equal angles increases, therefore, from zenith to horizon, since they are at an apparently greater distance. Literaturbericht.

Carson, Thomas G. *Man's Responsibility.* How, and Why, the Almighty Introduced Evil upon the Earth. New York and London: G. P. Putnam's Sons. 1905. 12mo. Pp. vi + 524.

Frenzel, Carl. *Über die Grundlagen der exacten Naturwissenschaften.* Leipzig und Wien: Franz Deuticke. 1905. 8vo. Pp. 145. 3 M.

Grotenfelt, Arvid. *Geschichtliche Wertmassstäbe in der Geschichtsphilosophie bei Historikern und in Volkbewusstsein.* Leipzig: Teubner. 1905. 8vo. Pp. 211.

Hennig, Richard. *Wunder und Wissenschaft.* Eine Kritik und Erklärung der okkullen Phänomene. Hamburg: Schultze. 1904. 8vo. Pp. 247. 4 M.

Lipps, Theodor. *Die ethischen Grundfragen.* Hamburg und Leipzig: Leopold Voss. 1905. 8vo. Pp. 327. 5 M.

Peckham, George W. and Elizabeth G. *Wasps, Social and Solitary.* With an introduction by John Burroughs. Boston and New York: Houghton, Mifflin and Company. 1905. 12mo. Pp. xiv + 311. $1.50 *net.*

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Stephen, Leslie. *Freethinking and Plain Speaking.* With introductory essays on Leslie Stephen and his works by James Bryce and Herbert Paul. New York and London: G. P. Putnam's Sons. 1905. 8vo. Pp. lxiv + 410. $1.50 *net.*

Stöckl, Albert. *Lehrbuch der Logik.* Achte Auflage, neubearbeitet von Dr. Georg Wohlmuth. Mainz: Kirchheim & Co. 1905. 8vo. Pp. xviii + 479. 8 M.

NOTES AND NEWS

THE fifth annual meeting of the Western Philosophical Association was held at the University of Nebraska, April 21–22, 1905. Professor A. Ross Hill, president of the association, chose for the subject of the annual presidential address, 'Philosophy and Education.' The program of the meeting was as follows: 'The Place of the Time-Concept in Epistemology and in Metaphysics,' Professor J. E. Boodin; 'The Category of the Unknowable,' Mr. David F. Swenson; 'The Esthetic Attitude,' Dr. Robert Morris Ogden; 'Some Contradictions in Current Theories of the Psychology of the Judgment,' Professor W. B. Pillsbury; 'The Relation of Psychology to the Philosophy of Religion,' Professor F. C. French; 'The Meaning of Right,' Professor Frank Sharp. In addition, there was a general discussion on 'The Present Estimate of Kant's Place in the History of Theoretical Philosophy,' led by Professor A. O. Lovejoy, and voluntary reports in philosophy and psychology.

AT the recent meeting of the board of regents of the State University of Iowa, the following changes were made in the department of philosophy and psychology: Professor G. T. W. Patrick was granted leave of absence; Professor C. E. Seashore was made head of the department; Professor Arthur Fairbanks, of the department of Greek, was asked to give the courses in ancient and medieval philosophy and the philosophy of religion; Dr. J. B. Miner was promoted from instructor to assistant professor of philosophy, and Mr. Daniel Starch was appointed assistant in the laboratory.

THE Rev. William I. Chamberlain, now in charge of the missionary college at Verlore, India, has been appointed professor of philosophy at Rutger's College.

PROFESSOR HUGO MÜNSTERBERG, of Harvard University, has declined the offer of a chair of philosophy, tendered to him by the University of Königsberg.

PROFESSOR CHARLES M. BAKEWELL, associate professor in philosophy in the University of California, has been appointed professor in philosophy in Yale University.

DR. R. B. PERRY has been promoted to an assistant professorship of philosophy at Harvard University.